Fuel Cell Demonstration with Onsite Generation of Hydrogen

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This presentation does not contain any proprietary or confidential information

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NC Solar House and AFV Garage

AFV Garage

Objectives

- Education and outreach
- Baseline demonstration of hydrogen fuel with zero emissions from source to sink
- Supplemental and backup electrical power for operational purposes
- Core facility for hydrogen-related research at NC State University.

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Budget

- DOE Contribution: $100K
- Project Partners' Contribution: $100K

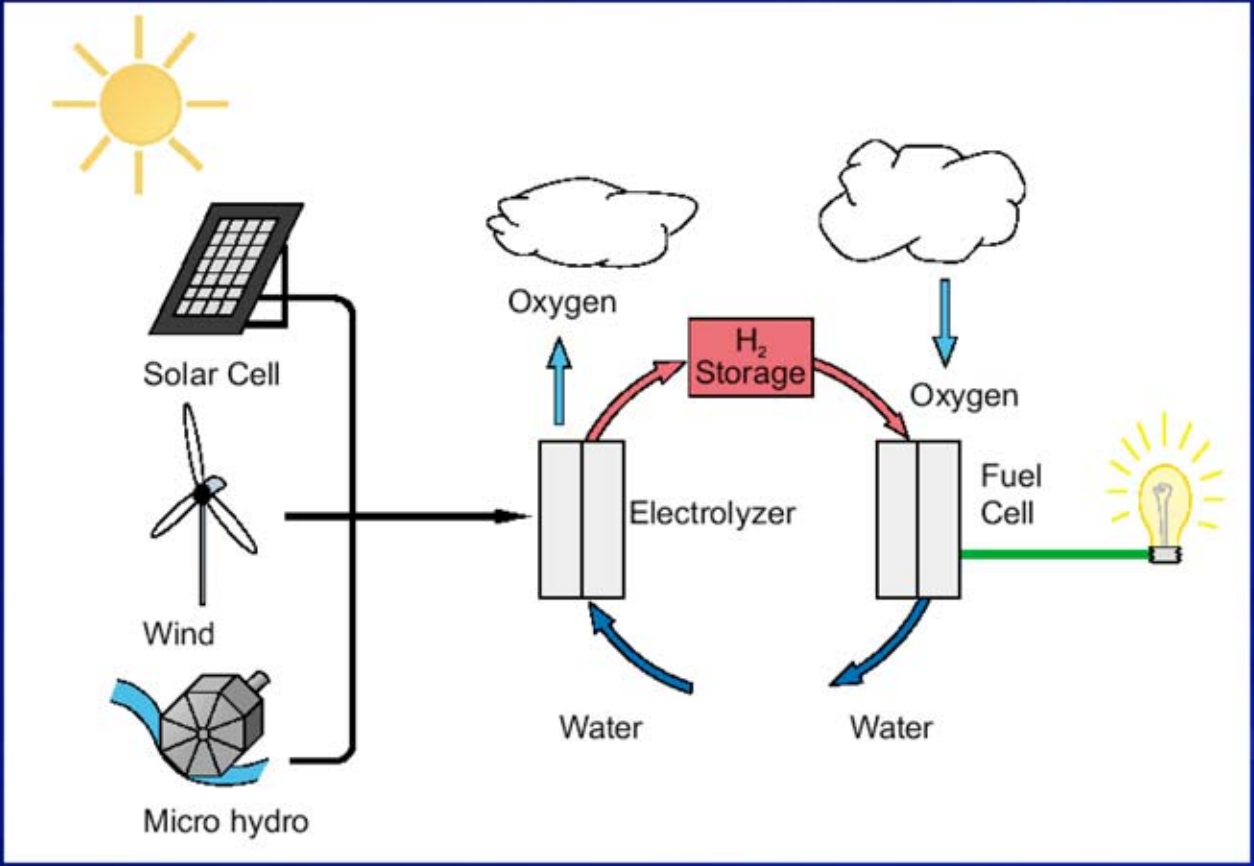
Technical Barriers and Targets

- Educational barriers
  A. Lack of awareness
  B. Lack of demonstrations or examples of real-world use
  C. Institutional barriers and access to audiences
- Educational targets
  3. Build presence of hydrogen in K-12 education programs
  7. Develop public education campaign

Approach

- Photovoltaic-powered electrolysis of water
- Low-pressure storage of hydrogen
- 3 kW PEM fuel cell: electricity on demand
  - Charging electric vehicles
  - Backup power for AFV garage

System Concept



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Hydrogen Demonstration

- Building-integrated PV panels
- Hogen 40 RE Electrolyzer
- Low-pressure storage tank
- Avista Labs Independence 1000 Fuel Cell

Project Safety

- Contract is not yet in place
- Developing the safety plan will be the first task of the project
- NC Solar Center will develop the plan in consultation with the Safety Office of NC State University
- The safety plan will follow DOE guidelines

Project Timeline

Phase 1 Design		
- Safety plan		1
- Systems design		2
- Facility design	3	
Phase 2 Purchase and Install	4, 5	
Phase 3 Outreach		
- Performance monitoring		6
- Education programs	7	

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Technical Accomplishments/Progress

- As of 23 April 2004, contract was not yet in place

Interactions and Collaborations

- Avista Labs provides fuel cell, engineering time
- Proton Energy Systems provides electrolyzer, engineering time, equipment cost share

Future Work

- Sign contract
- Develop safety plan
- Purchase and integrate system components
- Perform education and outreach
- Log and analyze system performance